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Q Fever

A Summary of the Occupational Health Concern

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Canadian Centre for Occupational Health and Safety

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Q FEVER--A SUMMARY OF THE OCCUPATIONAL HEALTH CONCERN

This publication was prepared as a source of information for health and safety committees and others with an interest in understanding and reducing the occupational risk of Q Fever.

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INTRODUCTION

Q Fever is a disease that spreads from animals to people. The disease is caused by a bacteria-like microbe that can be found in livestock, some wild animals, laboratory animals, and pets.

Infected animals carry the Q Fever microbe mostly in tissues involved in birth--the uterus, placenta, and birth fluids. Because of this, they spread the Q Fever microbe when they give birth. Infected animals also release the microbe in milk and manure.

The Q Fever microbe spreads through the air in fine droplets of fluid called aerosols as well as in dust from dried tissue, manure, hides, and wool.

Workers catch Q Fever by breathing in the extremely infectious microbe. They can get infections from only slight or occasional contact with infected animals, animal products, or fruit and vegetables contaminated with infected manure.

Q Fever is usually a mild illness. It often seems like the flu, but it does not normally spread from person to person. Most people recover quickly and develop resistance against further infections.

However, Q Fever can sometimes become a serious illness, causing lung infections and liver disease. In rare cases, it causes potentially fatal heart disease.

There is no simple way to rid Q Fever from animals. However, with vaccination, personal precautions, and simple hygienic measures, workers can reduce the risk of infection.

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1. WHAT IS Q FEVER AND WHAT CAUSES IT?

Q Fever is a "zoonosis"--an infectious disease that spreads from animals to humans. The "Q" in Q Fever stands for "query" or "question" because, when the disease was first noticed, its cause was not easily recognized.

Q Fever is caused by a microbe called "Coxiella burnetii," a "ricketsia" or bacteria-like microbe. This microbe survives for years in dust or soil, but has to enter the bodies of animals or humans before it can grow and reproduce.

When the Q Fever microbe enters the human body, it usually infects the cells that line the blood vessels. The body has little defense against the disease until the microbes reproduce and leave the cells to enter the bloodstream. At this point, they are usually killed by white blood cells.

2. HOW LONG DOES IT TAKE FOR Q FEVER TO DEVELOP?

The incubation period (the time between initial contact with the microbe and onset of the disease) for Q Fever ranges from 14 to 26 days. The average is 20 days. The length of the incubation period depends on the number of microbes a person is exposed to. Exposure to large numbers of microbes results in a short incubation period.

3. HOW COMMON IS Q FEVER IN CANADA?

The frequency of Q Fever infections in Canada is not accurately known because only a small fraction of cases are recognized and reported. Over the past thirty years, outbreaks have been reported in slaughterhouses in Alberta and Quebec and in a medical research laboratory in Ontario. About 15-30 cases of Q Fever have been reported each year in Ontario.

Recent research indicates that Q Fever is very common in some regions of Canada. Testing of donated human blood samples from Nova Scotia and Prince Edward Island showed that 10-15 percent of people had had Q Fever at some time in their lives. Q Fever was also found to be responsible for over 21 percent of hospitalized cases of pneumonia in rural areas of Nova Scotia.

The frequency of Q Fever in livestock, wild animals, laboratory animals, and pets across Canada is not known. Recent studies have found Q Fever in sheep and goats in Ontario and Quebec. Cattle and cats appear to be the major sources of Q Fever in Nova Scotia although it is also found in sheep, goats, and wild rabbits.

4. WHERE IS THE SOURCE OF Q FEVER IN THE WORKPLACE?

The Q Fever microbe can be brought into the workplace either directly in infected animals or indirectly as infectious dust from animals or contaminated animal products.

Infected Animals

Workers can get Q Fever from a wide variety of different animals:

- wild animals
- farm livestock--especially cattle, sheep and goats
- laboratory animals--especially sheep
- household pets--especially cats

Blood-sucking ticks spread the Q Fever microbe to wild animals, but seldom to humans. Farm livestock, laboratory animals, and pets, however, can pick up Q Fever directly from other infected animals or from contaminated surroundings.

Q Fever is a special concern with pregnant animals, especially around the time they give birth or abort because of the disease. In pregnant animals, the Q Fever microbe builds up to enormous numbers in certain tissues and fluids. These include:

- the uterus or womb
- the placenta, which surrounds the offspring in the womb
- the mammary glands or udders
- birth fluids
- milk

Studies show that one gram of placenta from an infected sheep can contain over one billion Q Fever microbes.

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These microbes become airborne in tiny droplets of mists or aerosols and spread to workers:

- when animals give birth
- during processing of infected tissues from slaughtered animals
- at milking or during the processing of milk
- during animal surgery

Infectious Dust

After giving birth, animals usually eat their placenta and other tissues of afterbirth. When this happens, the Q Fever microbes survive digestion. They pass along the animal's intestine and become discharged with the manure. This allows Q Fever to spread widely throughout the environment.

The Q Fever microbe easily becomes airborne with dust from infected animal tissues, manure, or soil. As a result, workers can become exposed to Q Fever by contacting various infected materials.

- dust from animals, bedding, or manure
- soil near animal pens
- animal hides, wool, and furs
- clothes from workers who were exposed to infected animals or materials

5. HOW DO Q FEVER INFECTIONS OCCUR IN THE WORKPLACE?

Workers generally contract Q Fever when they breathe in the Q Fever microbe. It is very infectious. As few as ten Q Fever microbes can start an infection if inhaled within a short period of time.

Workers can also get Q Fever by drinking infected milk, but most infections are spread through the air.

6. WHICH WORKERS HAVE INCREASED RISK OF Q FEVER?

Q Fever is an occupational risk for workers who have even slight or indirect contact with animals, animal products, or animal waste.

- farmers, ranchers, and farm workers in contact with cattle, sheep, or goats
- stockyard workers, truck drivers, personnel who service the trucks, and visitors to animal auctions
- meat packers, rendering plant workers, hide and wool handlers
- hunters and trappers
- laboratory animal researchers and support staff
- workers who care for pets and livestock--veterinary personnel, pet shop workers and zoo attendants
- certain groups of medical and health care personnel who have contact with blood, sputum or tissue from infected patients.

Q Fever spreads easily throughout agricultural regions affecting anyone who works outdoors in contact with infected soil or dust.

The microbe spreads easily within buildings from room to room. Workers in research facilities can catch Q Fever even if they only visit an infected room or hallway once or twice.

General medical staff do not normally get Q Fever from infected patients.

7. HOW DO YOU KNOW IF YOU HAVE Q FEVER?

There is no single, simple means to distinguish Q Fever from common flu-like illnesses. Often, a physician must have some reason to suspect Q Fever before a diagnosis can be made. This is why it is important for physicians to know if workers with unexplained, flu-like illnesses were ever in contact with animals.

The signs and symptoms of Q Fever vary greatly:

- sub-clinical or unnoticed
- acute or a sudden illness
- chronic or long-term illness

Sub-clinical Q Fever

People can have Q Fever without knowing it or mistake it for mild flu. Often, it is impossible to tell without laboratory tests.

Acute Q Fever

Sometimes, Q Fever strikes as a sudden illness, affecting a large number of people in the same workplace. Common signs and symptoms resemble a serious case of the flu:

- sudden onset of high fever
- chills and sweating
- headache and muscle pains
- general feeling of sickness and loss of appetite

About 50 percent of patients develop a slight, dry cough because of a lung infection known as pneumonitis. Most symptoms disappear after 7-10 days. However, afflicted people can feel generally ill with loss of appetite for several weeks. Some individuals lose 15-20 pounds.

Chronic Q Fever

About 20 percent of acute cases become chronic, with symptoms that last longer than 4 weeks. Many individuals with chronic Q Fever develop hepatitis or liver disease. Only a small number of these cases have jaundice, a darkening of the skin and urine caused by a malfunctioning liver.

Rare cases of chronic Q Fever, usually with hepatitis, develop endocarditis or chronic infections in the valves of the heart. This condition is very serious because it can lead to fatal heart disease.

8. WHAT TESTS ARE AVAILABLE FOR Q FEVER?

Laboratory tests for Q Fever measure antibodies that circulate in the blood. Antibodies are protective substances that the body produces in defence against infectious diseases. Q Fever can be diagnosed in patients who develop these antibodies in their blood following a period of unexplained feverish illness.

When people become infected with Q Fever, the body usually produces two specific antibodies called Phase I and Phase II. Chronic Q Fever can be detected when a patient with a long-term illness produces only Phase I antibodies in large amounts over a long period of time.

9. WHAT IS THE TREATMENT FOR Q FEVER?

The antibiotic, "tetracycline," is often used to treat Q Fever. Victims usually recover promptly when treatment is started without delay.

Rare cases of chronic Q Fever that develop endocarditis or an infection of the heart can be very difficult to treat. Surgery may be necessary to replace infected valves of the heart.

10. HOW CAN THE SPREAD OF Q FEVER BE PREVENTED IN THE WORKPLACE?

For most effective prevention, the Q Fever microbe should be eliminated from animals. Eradication programs, however, are not yet available because Q Fever spreads so effectively among animals. Such programs seldom have high priority because Q Fever is often considered to be a rather mild disease in people. It seldom has economic impact on livestock.

Procedures should still be developed to reduce the risk of Q Fever in the workplace because of the serious complications that can sometimes develop.

Specific recommendations will depend on the individual situation. The following general recommendations, however, apply to all workers who have even remote contact with animals, animal products, and animal waste.

- All workers with potential risk of Q Fever should be informed about the disease, its characteristics, and the nature of the risk
- Workers who start jobs with increased risk of Q Fever should be offered blood tests to determine if they have resistance to Q Fever or whether they should consider vaccination
- The possibility of Q Fever should be investigated in high risk workers who develop an unexplained feverish illness, especially if lung infections develop
- Cases of Q Fever should be reported to appropriate health officials. In some regions, doctors are legally required to report all confirmed cases of Q Fever to government health officials.

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The risk of infection from the workplace can be reduced by:

- vaccination of workers
- personal precautions
- workplace hygiene

11. WHAT KIND OF VACCINATION IS AVAILABLE?

A vaccine is available to protect workers exposed to the Q Fever microbe. The use of this vaccine should be limited to those at high risk of exposure whose blood tests for resistance to Q Fever are negative. Before vaccination, workers must also have a skin test to determine if they are allergic to the vaccine.

So far, research on vaccination programs for animals has not had practical success.

12. WHAT PERSONAL PRECAUTIONS CAN BE TAKEN?

Personal precautions can reduce exposure to the Q Fever microbe and possibly prevent it from spreading within the workplace.

- Access to workplaces with increased risk of Q Fever should be restricted to workers required to be there.
- Protective clothing should be worn by workers exposed to animal tissue. Contaminated clothing should be labelled with a biohazard warning and washed using laundry procedures for disinfection.
- No eating, drinking, smoking, or nail-biting should be allowed in animal holding facilities. Hands should be washed frequently.
- Animal tissue should be handled with care, especially tissue involved in birth.
- Production and exposure to aerosols from animal tissues should be minimized. Respiratory protection devices suitable for preventing aerosol inhalation should be worn by workers at increased risk of inhaling contaminated droplets.
- Acceptable laboratory techniques as outlined in "Biosafety in Microbiological and Biomedical Laboratories" should be used in research or diagnostic laboratories that process blood and tissue from animals or patients with Q Fever.

13. WHAT IS RECOMMENDED FOR WORKPLACE HYGIENE?

Procedures should be developed to prevent the Q Fever microbe from being released and spreading within the workplace. Each workplace should have procedures to disinfect or sterilize areas that may be contaminated with the Q Fever microbe.

- In medical research laboratories associated with hospitals, animals should be kept in separate facilities to reduce the possibility of the Q Fever microbe spreading to staff and patients. Use of common elevators and loading docks should be avoided.
- Pregnant ewes should not be used in research laboratories unless they have negative antibody tests for Q Fever.
- Biosafety containment equipment and facilities should be used in laboratories as recommended in "Biosafety in Microbiological and Biomedical Laboratories."
- When livestock give birth, they should be confined and closely observed. The placenta and other birth tissues should be collected before the animals eat them and disposed of safely.
- Infectious waste should be packaged in puncture-proof, leak-proof containers that are clearly labelled and sterilized before disposal according to procedures developed for biological hazards.
- Surfaces, floors, and walls contaminated with fluids or dust from animals should be disinfected using procedures established for infection control.

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